

### Claims

1. A method of determining a rubbing friction torque for a motor vehicle powertrain including an internal combustion engine, the method comprising the steps of:

- 5           determining a base rubbing friction torque  $RFT_{base}$  at a base temperature  $T_{base}$  of said powertrain;
- measuring and recording fuel cutoff deceleration values (DECEL) of said engine at a plurality of test temperatures of said engine including said base temperature  $T_{base}$ ; and
- 10           calculating a test rubbing friction torque  $RFT_{test}$  at a given test temperature  $T_{test}$  according to:

$$RFT_{test} = (RFT_{base} * DECEL_{test}) / DECEL_{base}$$

- 15    where  $DECEL_{test}$  is the fuel cutoff deceleration at test temperature  $T_{test}$  and  $DECEL_{base}$  is the fuel cutoff deceleration at base temperature  $T_{base}$ .

2. The method of Claim 1, including the steps of:

- obtaining a base pumping loss  $PFT_{base}$  of said engine at said base temperature  $T_{base}$ ;
- obtaining a test pumping loss  $PFT_{test}$  of said engine at said test
- 5    temperature  $T_{test}$ ; and
- calculating said test rubbing friction torque  $RFT_{test}$  according to:

$$RFT_{test} = (RFT_{base} + PFT_{base}) \times \frac{DECEL_{test}}{DECEL_{base}} - PFT_{test} .$$

3. The method of Claim 1, including the step of:

recording said fuel cutoff deceleration values (DECEL) of said engine as a function of both test temperature  $T_{\text{test}}$  and engine speed.

4. The method of Claim 1, including the steps of:  
measuring said fuel cutoff deceleration values (DECEL) at a plurality of engine speeds for each of said test temperatures  $T_{\text{test}}$ ; and  
recording the measured fuel cutoff deceleration values (DECEL) as a  
5 function of both test temperature  $T_{\text{test}}$  and engine speed.

5. The method of Claim 1, wherein the step of determining said base rubbing friction torque  $RFT_{\text{base}}$  includes the steps of:  
determining rubbing friction torque test data during engine operation at a substantially constant speed and different engine fuel flow values; and  
5 extrapolating said rubbing friction torque test data to a zero engine fuel flow to obtain said base rubbing friction torque  $RFT_{\text{base}}$ .

6. The method of Claim 1, including the steps of:  
alternately enabling and cutting off fuel flow to said engine to cycle a speed of said engine between first and second setpoints to define recurring intervals of fuel cutoff deceleration; and  
5 measuring said fuel cutoff deceleration values during said recurring intervals of fuel cutoff deceleration.